useful addition to a subject the literature of which is not extensive.

In dealing with the more theoretical matters concerning the laws of expansion and compression of gases the author is not so fortunate, and there are a number of loose and careless statements. Thus on p. 160 we find Boyle's law stated as follows: At constant temperature the volume of gas is proportional to the absolute pressure. The author is not unaware of the fact that the volume is inversely proportional to the absolute pressure, but this and other similar careless statements of facts mar an otherwise good and useful volume, and call for a thorough revision for the second edition.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Electrical Notation.

SIR JOSEPH LARMOR'S letter in NATURE of January 21 (p. 561) reminds me that I have long wished to protest against the misuse of alphabetical symbols to designate the names of units. The word *ohm*, for instance, ought not to be abbreviated to ω; and the apparently authoritative suggestion now made that other names shall be written in the same sort of unreadable and worrying shorthand is essentially, though not superficially, illiterate as well as utterly unmathematical.

The *naming* of units has been conspicuously useful; the consumption of much-needed and already overworked symbols as substitutes for names is a wasteful practice which should be resisted among physicists, and be only tolerated in microscopy for purely biological use.

OLIVER LODGE.

University of Birmingham, January 23.

Mendelism in the Seventeenth Century.

THE Mendelian revival of breeding has brought to light many interesting facts concerning the inheritance of coat-colour in rabbits. From the work of Hurst, Castle, Punnett, and others, it is now known that when the wild "grey" or "agouti" rabbit is mated with white, black, or "blue" specimens, the offspring produced all display the colour of their wild parent. Although this is doubtless well known at the present day, it is, I believe, not generally known that these facts had been ascertained by rabbit-fanciers in Holland in the seventeenth century, and were put on record by the illustrious Leeuwenhoek in 1683.

In a letter from Leeuwenhoek to the Royal Society, addressed to Sir Christopher Wren, and dated July 26, 1683, the following remarkable passage occurs:—

"Multi nostratium civium alunt cuniculos, cum ad voluptatem, tum ob lucrum: suntque hi cuniculi plerumque magni atque albi, auribus praelongis donati, quod pulchritudinis loco ducunt. Ut vero hi cuniculi in lucem edant pullos grisei sive cinerei coloris, qualis est sylvestrium, utque pro his possint verno tempore vendi, foemellae albae marem griseum ac sylvestrem ex tumulis arenarum petitum, ubi omnes grisei coloris sunt, sociant: atque tales masculos intense griseos committunt non tantum cum albis, sed & versicoloribus, nigris, caeruleis foemellis: Ex quibus tamen quicquid procreatur, colorem patris refert; ut nunquam etiam observatus sit ullus ex tali jugatione productus cuniculus, qui fuerit capillo albo, aut alio quam griseo. Praeterea tales nunquam attingunt magnitudinem matris, neque aures acquirunt praelongas, neque pro matris natura plane cicurantur ac mansuefiunt, sed retinent semper aliquid ferocioris ferinaeque naturae ac indolis."

The letter will be found in the so-called "Opera Omnia" of Leeuwenhoek (Lugd. Batav., 4 vols., 1722). Owing to the confusing arrangement and pagination in this work—which consists of a number of separate sections, published at different dates, each with its own pagination—it is not easy to give an exact reference to a particular passage. In the copy of the "Opera Omnia" which I have consulted, the letter occurs on p. 49 (first pagination) of vol i. ("Anatomia et Contemplationes"), under the title, "De generatione Ranarum," etc. The passage in question begins at the foot of the following p. 53.

I may add that the letter is not to be found in Samuel Hoole's English edition of Leeuwenhoek's "Select Works" (London, 2 vols., 1798, 1807). This translator expurgated all Leeuwenhoek's letters dealing with spermatozoa. He calls them "Disquisitions of a peculiar kind, which to many Readers might be offensive."

Feeling some doubt as to the colour or marking which "*versicolor*" is intended to denote, I compared the Latin letter with an English version which was published under the title, "*An Abstract of a Letter from* Mr. Anthony Leeuwenhoeck *of* Delft *about Generation by an* Animalcule *of the Male Seed*, etc.," in the *Philosophical Transactions* of the Royal Society, vol. xiii. (xii.), p. 347, 1683. Both Latin and English versions are translations from the Dutch: for Leeuwenhoek could write no language but his own. In the English version, which is somewhat differently worded from the Latin, the words "*versicoloribus, nigris, caeruleis*" are rendered "Blew, Black, and Pyed." "*Versicolor*" evidently denotes some kind of piebald marking; though it probably does not mean—as one might perhaps conclude—the modern "Dutch" pattern. This, Prof. Punnett tells me, is of comparatively recent introduction, and has superseded an earlier or "original Dutch" marking which "has less white and has practically dropped out of the fancy."

It is clear from Leeuwenhoek's words that the Dutch rabbit-fanciers had, as early as 1683, discovered that the offspring produced by mating wild "grey" buck rabbits with tame long-eared white, black, blue, or piebald does, are always exclusively grey in colour; and that they are sufficiently like the wild rabbit in other respects also for them to be marketable as such.

Leeuwenhoek's statement that the hybrids produced by crossing piebald with wild rabbits are invariably "grey" in colour—without any white—seems open to question. Recent experiments have not yet solved the problems of the inheritance of pied patterns in rabbits. Prof. Punnett, who has been studying the matter for some years, tells me that when wild rabbits are crossed with modern Dutch, "the F_1 animals may be, though rarely, completely self-coloured. Generally they have a little white. The amount of this varies, but never approaches the amount found in the Dutch."

The statement that the progeny of long-eared tame doe-rabbits and wild males never possess such long ears as their mothers, appears to have been confirmed by Castle. "He crossed the long-eared lop rabbit with ordinary short-eared individuals. F_1 had ears of intermediate length" (Bateson, "Mendel's Principles of Heredity," 1909, p. 251). I do not know of any confirmation or contradiction of Leeuwenhoek's final

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assertion that the offspring of wild males and tame females tend to manifest the wild temper of their fathers.

It seems remarkable that nobody—so far as I am aware—has hitherto directed attention to the passage which I have quoted above. It occurs incidentally in a letter which described such novelties as the spermatozoa and red blood-corpuscles of the frog, and the ciliate Protozoa parasitic in the frog's intestine. But it is perhaps even more remarkable that neither Leeuwenhoek at the time, nor anybody else for some two hundred years subsequently, perceived the importance of such observations as the rabbit-fanciers of Holland had made. Leeuwenhoek was, of course, an "animalculist": and he cites the case of the rabbits to confute "*non nemo Doctorum*"—evidently an "ovist"—and to "bring a sufficient proof of the fruits coming from the *Male seed,* and the *females* only contributing to the nourishment and growth of it."

Leeuwenhoek's remarks evidently do not constitute the earliest known reference to rabbit breeding. For Darwin ("Animals and Plants," chapter iv.) gives earlier references to Gervaise Markham (1631), and Aldrovandi (1637), which show that several kinds of rabbit were already kept and bred at the beginning of the seventeenth century. Nevertheless, the passage which I have quoted above is, perhaps, the earliest exact account—based upon experiment—of the inheritance of any character in any animal or plant; and as such I think it is worthy of record.

I am indebted to my friend, Prof. R. C. Punnett, F.R.S., for information on certain matters mentioned in this letter; and I would refer the reader interested in the subject to his important paper, "Inheritance of Coat-Colour in Rabbits," published in the *Journal of Genetics,* vol. ii., No. 3, 1913, for further facts.

CLIFFORD DOBELL.

Imperial College of Science, South Kensington, London, S.W., January 15.

Books for Belgian Students.

WE are gradually building up a little Belgian University here for students who, for one reason or another, cannot go to the front, and for professors who are past the age of serving. Altogether we have between one hundred and two hundred students, and some fifteen to twenty professors.

Last term we were able to establish effective teaching in four faculties, and this term we have increased the number to six. In the faculty of medicine we are in need of copies of some standard text-book on human anatomy—preferably Gray's.

This University has already found several thousand pounds to support our guests, and will have to find several thousands more to keep things going until next June. Consequently we have to husband our resources very carefully, and cannot afford to purchase such expensive text-books as Gray's "Human Anatomy."

It may be that your readers have copies of this work lying unused on their shelves. If this is so, I should be grateful if they would send them to me for the use of these students. At present ten or a dozen copies would suffice.

A. E. SHIPLEY.

Christ's College Lodge, Cambridge, January 25.

An Unexplained Laboratory Explosion.

I SHALL be glad if any of your readers can give me an explanation of the following occurrence.

Owing to the fact that we are somewhat out of the way here, and, in consequence, fresh bleaching powder is difficult to obtain, I have found it necessary, when demonstrating the formation of chloroform, to find some method other than the usual treatment of alcohol with bleaching powder.

With this object, a few days ago I prepared a mixture of 60 grams of slaked lime with 400 c.c. of cold water and 40 c.c. of alcohol. The mixture was placed in a 2000 c.c. flask, through the cork of which a long tube conducted chlorine to the bottom of the liquid. Through the cork also went another short tube connected to a condenser.

Chlorine had been passing into the liquid fairly quickly for about twenty minutes, and the contents of the flask had warmed up to perhaps 50° C., when a slight smell of chlorine became evident at the end of the condenser, together with a small amount of white fumes; but inside the big flask, except for the slight rise of temperature, there was no evidence of chemical action. Suddenly, with no warning whatever, the whole apparatus blew up; I might almost say detonated, as there was not a piece bigger than a sixpence left, either of the flask, the condenser, or the small flask put to catch the distillate when it should arrive.

Owing perhaps to the violence of the explosion, I got off with a few scratches on my face. My clothes were cut by pieces of glass, however, and the fragments were scattered for at least six yards all round. There was no odour, either of chloroform or anything else, apparent; only that of the chlorine from the generating flask, which, curiously enough, had escaped injury. The whole delivery tube was intact, and also the exit tube from the big flask, the neck of which, with the cork, was left sticking in the clamp, so that I was able to be sure that the trouble was not due to a blocking up of the exit.

W. F. A. ERMEN.

O. Granbery, Juiz de Fóra, Minas, December 11, 1914.

Demonstration of Strain-hardening of Steel.

THE accompanying photograph (Fig. 1) represents the side of a steel bar. The bar was first marked by a punch in the way shown, and the punch marks were afterwards completely filed out. The side was then polished and the bar pulled in a testing machine beyond the elastic limit of the material. The polished surface was gradually destroyed everywhere except just under the punch marks, where the overstrained

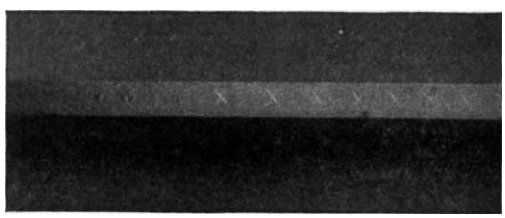

FIG. 1.

material retained its polish and the marks again became evident. In the strained bar the marks remain distinctly raised above the rest of the surface. A similar experiment was made with a shorter bar that was afterwards subjected to compression along its length. Again the punch marks became clearly visible, but this time they remained as polished depressions instead of raised surfaces.

R. W. CHAPMAN.

The University of Adelaide, South Australia, November 30, 1914.

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